



# Australian Bureau of Statistics

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### Feature Article - Population Projections 1997 - 2051

#### INTRODUCTION

The Australian Bureau of Statistics (ABS) currently publishes population projections every two to three years in order to regularly service the needs of users of population projections. In July 1998, ABS released Population Projections 1997 to 2051 (cat. no. 3222.0) which presents projections of the population of Australian States and Territories from 1997 to 2051. This article defines the concept of population projection used in the study and reports a selection of the main findings. Important information about the assumptions underlying these latest official population projections are contained in Appendix 1.

#### POPULATION PROJECTIONS DEFINED

Population projections are estimates of future populations based on assumptions of demographic trends. They are illustrations of the population growth which would occur if certain selected assumptions about future demographic trends were realised.

Population projections are not predictions or forecasts. They are an assessment of what will happen to Australia's population if recent trends were to continue for the next 50 years. The projections in this article are not intended to predict where we will be in 2051, but rather where we are currently heading.

These projections reveal the size, structure and distribution of the future population under various assumptions for the components of change births, deaths and migration.

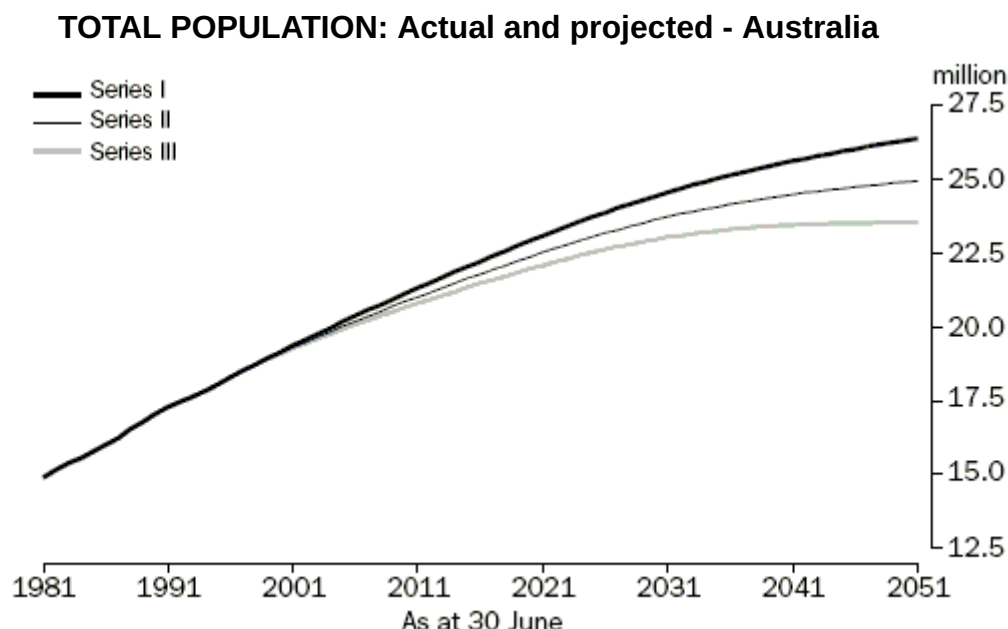
Two alternative assumptions have been made about future births (1.75 or 1.6 births per woman), one assumption about future deaths, two alternative assumptions about future levels of net overseas migration (70,000 persons and 90,000 persons per year) and three alternative assumptions about interstate migration. An additional assumption of zero net overseas migration has been included to enable an assessment of the effect overseas migration on population growth and distribution. Further information about the assumptions is contained in Appendix 1.

Using various combinations of these assumptions, eighteen projections have been made of the population. Only three of these projections (identified as Series I, II and III) are covered in this article. Series I and III are used to show a projection range, although not the full range, of probable or possible future outcomes (Series I = high projection; Series III = low projection). In some cases, to simplify the analysis, only one series has been used. Where this is done, the medium series, Series II, has been chosen.

The base population used for the projections is the published estimate of 18.5 million at 30 June 1997 in Australian Demographic Statistics (cat. no. 3101.0).

## POPULATION SIZE

Australia The projections show Australia's population continuing to grow throughout the period 1997-2051. The population is projected to increase from 18.5 million in 1997 to around 19.3 million in 2001 and between 22.1 and 23.1 million in 2021. By the end of the projection period the population is projected to rise to around 23.5 million (Series III), 24.9 million (Series II) or 26.4 million (Series I). These represent growth of 27%, 35% and 42% respectively between 1997 and 2051.



International comparison United Nations' medium variant projections show that the rapidly growing populations of South-East Asia present prospects of a widening gap in terms of population size between those countries and Australia. This will occur even though it is projected that these countries will

experience declining (though still positive) population growth rates in the future. Indonesia's population, already 10 times that of Australia, could increase to nearly 319 million in the year 2050, over 12 times Australia's projected population. Malaysia's population, which is currently similar to Australia's, could almost double to 38 million in the year 2050, exceeding the population of Australia by over 13 million or 53%. During the same period Australia's nearest neighbour, Papua New Guinea, is projected to experience growth rates of over 2% per year, resulting in a more than doubling of its population to 9.6 million.

States and Territories Table 1 shows actual and projected population levels for each State and Territory and its capital city. The highest rates of growth between 1997 and 2051 are projected to occur in the Northern Territory (between 84% and 154%), Queensland (between 76% and 90%) and Western Australia (between 67% and 74%).

Queensland is projected to replace Victoria as the second most populous State between 2022 and 2048, while the population of the Australian Capital Territory would overtake that of Tasmania between 2037 and 2043. The Northern Territory would overtake the populations of both Tasmania and the Australian Capital Territory between 2039 and 2086.

Tasmania is the only State or Territory where the population is expected to decline under each of the projection series. The population of Tasmania is projected to decline by between 20% and 58%, from 474,000 in 1997 to between 198,000 and 381,000 in 2051.

## POPULATION: Actual and projected

	NSW '000	Vic. '000	Qld '000	SA '000	WA '000	Tas. '000	NT '000	ACT '000	Aust. '000
CAPITAL CITY									
1997									
Actual	3 934.7	3 312.7	1 548.3	1 083.1	1 319.0	195.5	84.3	309.5	11 796.1
2051									
Series I	6 212.8	4 566.0	2 782.3	1 155.7	2 342.6	196.5	128.8	(a)	..
Series II	5 269.4	4 084.5	2 924.7	1 060.2	2 300.5	197.5	235.5	(a)	..
Series III	4 732.0	3 641.9	2 938.2	910.9	2 241.4	198.5	235	(a)	..
TOTAL									
1997									
Actual	6 274.4	4 605.1	3 401.2	1 479.8	1 798.1	199.5	187.1	309.8	18 532.2
2051									
Series I	8 682.1	5 875.8	5 970.6	1 550.7	3 133.1	200.5	343.9	443	26 383.8
Series II	7 860.9	5 242.0	6 203.2	1 400.2	3 097.9	309.7	440.1	387.3	24 944.7
Series III	7 273.5	4 693.4	6 454.0	1 197.1	2 996.0	197.5	476	239.6	23 530.4

(a) Separate projections not produced for Canberra

**Capital cities** The populations of most capital cities are projected to increase over the projection period, with the largest proportionate increases in Darwin (between 53% and 179%), Brisbane (between 80% and 90%) and Perth (between 70% and 78%).

Under projection series II and III, the population of Darwin would overtake the population of Hobart between 2025 and 2030.

The population of Hobart is projected to decline under each projection series. Under Series II, Hobart's population could drop by 36% over the projection period.

## IMPACT OF VARYING ASSUMPTIONS

The projections series shown in this article do not take into account all possible levels in the components of population growth (fertility, mortality, overseas migration and internal migration). The two factors which have the greatest impact on national population growth are fertility and overseas migration.

## FERTILITY

Each shift in the total fertility rate of 0.1 births per woman changes the projected 2051 population by about 1 million persons.

## OVERSEAS MIGRATION

If there were no net overseas migration gain from 1997, the population would decline to between 18.3 million and 19.5 million in 2051, after reaching a peak of between 20.1 million and 20.6 million in the period 2025-29.

Each additional 1,000 net overseas migrants per year to 2051 would add 77,000 to the total Australian population by 2051, given a total fertility rate of 1.75 births per woman. This level

varies according to the fertility and mortality of these migrants and their descendants.

Changes in net overseas migration have little effect on the age structure of the Australian population. With net overseas migration of 70,000 per year by 1999, the median age in 2051 would be 44-46 years. With no net overseas migration, the median age in 2051 would be 47-49 years.

## POPULATION DISTRIBUTION

New South Wales, Victoria, South Australia and Tasmania are projected to experience declines in their shares of the Australian population, while Queensland, Western Australia and the Northern Territory are expected to gain in their percentage shares for all Series.

In 1997, about 64% of the Australian population lived in capital cities. This concentration is expected to continue throughout the projection period. By 2051, it is projected that between 20% and 24% of the Australian population would live in Sydney (compared to 21% in 1997), and between 16% and 17% would live in Melbourne (compared to 18% in 1997). Between 11% and 13% of the population would live in Brisbane while between 9% and 10% would live in Perth in 2051, increasing from their 1997 values of 8% and 7% respectively.

The proportions of the population living in Adelaide and Hobart are projected to decline under each Series. Adelaide is projected to drop from 6% in 1997 to about 4% by 2051, while Hobart is projected to drop from 1% in 1997 to between 0.4% and 0.6% over the same period.

Under Series II and III, Darwin is projected to more than double its share of the Australian population, increasing from 0.5% in 1997 to between 0.9% and 1.0% by 2051. Little change in the proportion of the population living in the Australian Capital Territory is expected under Series I and II. However, under Series III, this proportion is projected to drop from a little under 2% to 1% by 2051.

### POPULATION DISTRIBUTION: Actual and projected

Capital city/balance of State	AS AT 30 JUNE 1997 Actual %	AS AT 30 JUNE 2021			AS AT 30 JUNE 2051		
		Series I %	Series II %	Series III %	Series I %	Series II %	Series III %
Sydney	21.2	22.2	21.1	20.6	23.5	21.1	20.1
Balance of New South Wales	12.6	11.1	11.6	11.8	9.4	10.4	10.8
Total New South Wales	33.9	33.3	32.7	32.4	32.9	31.5	30.9
Melbourne	17.9	17.7	17.3	16.9	17.3	16.4	15.5
Balance of Victoria	6.9	6	5.9	5.8	5	4.6	4.5
Total Victoria	24.8	23.7	23.1	22.7	22.3	21	19.9
Brisbane	8.4	9.4	9.9	10.2	10.5	11.7	12.5
Balance of Queensland	10	11.1	11.5	12.3	12.1	13.1	14.9
Total Queensland	18.4	20.5	21.5	22.6	22.6	24.9	27.4
Adelaide	5.8	5.1	5.1	4.9	4.4	4.3	3.9
Balance of South Australia	2.1	1.8	1.8	1.7	1.5	1.4	1.2
Total South Australia	8	7	6.9	6.7	5.9	5.6	5.1
Perth	7.1	8	8.1	8.3	8.9	9.2	9.5
Balance of Western Australia	2.6	2.8	2.8	2.8	3	3.2	3.2
Total Western Australia	9.7	10.8	11	11.1	11.9	12.4	12.7
Hobart	1.1	0.8	0.8	0.7	0.6	0.5	0.4
Balance of Tasmania	1.5	1.2	1.2	1	0.8	0.7	0.5
Total Tasmania	2.6	2	1.9	1.8	1.4	1.2	0.8

Darwin	0.5	0.4	0.6	0.7	0.5	0.9	1
Balance of Northern Territory	0.6	0.6	0.6	0.7	0.8	0.8	1
Total Northern Territory	1	1.1	1.3	1.4	1.3	1.8	2
Total Australian Capital Territory	1.7	1.7	1.6	1.4	1.7	1.6	1
Total Australia	100	100	100	100	100	100	100

## GROWTH RATES

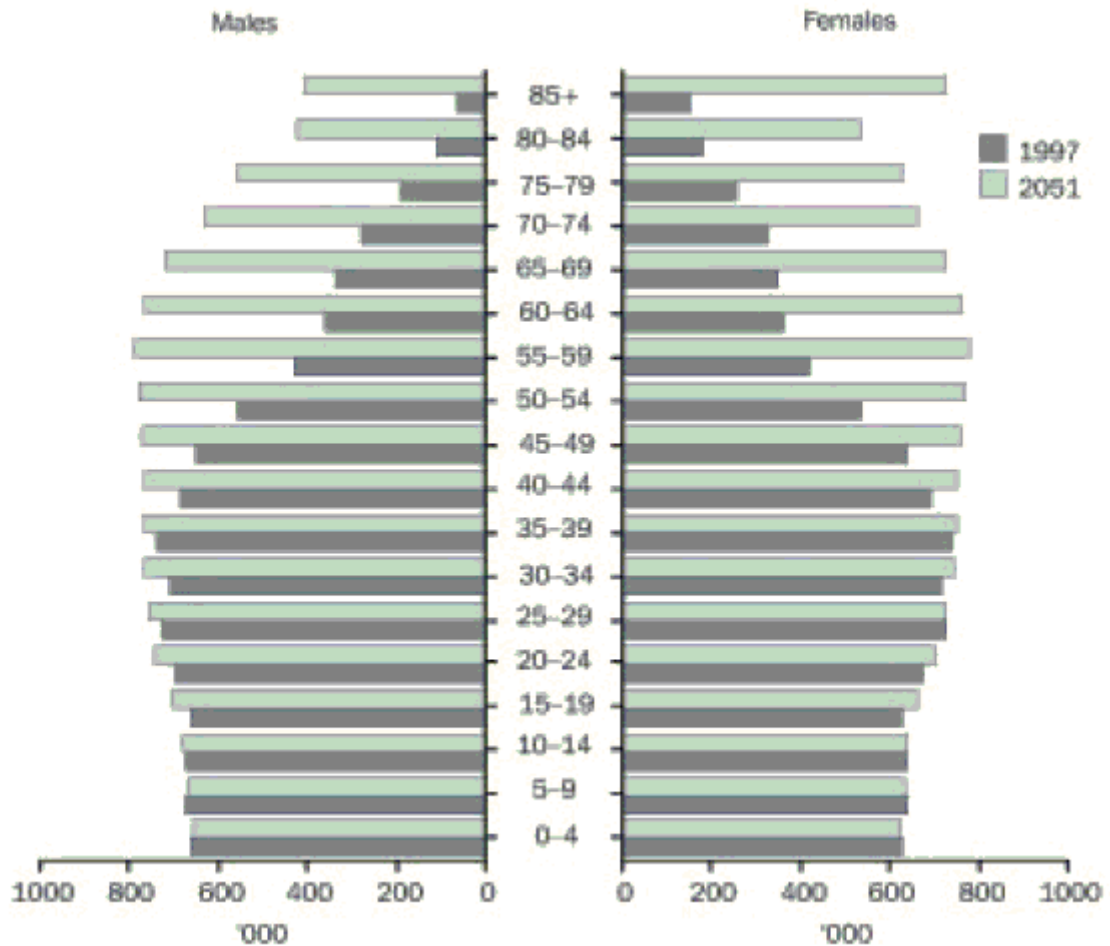
While the projections show Australia's population rising throughout the period 1997-2051, there is a clear long-term trend of decline in the rate of population growth. Between 1997 and 2001, Australia's average annual growth rate is projected to be between 1.0% and 1.1%. This growth rate is projected to fall to between 0.0% and 0.3% annually by the end of the projection period. Rates this low have not been experienced in Australia since European settlement.

Population projections of some of Australia's major trading partners also show very low and even negative growth rates. The populations of both Japan and Germany are projected to decline to levels below their current populations, with their growth rates from 1995 projected to fall by an average -0.4% and -0.8%, respectively, by the year 2050.

### PROJECTED POPULATION - Australia

Year ended 30 June	Series I	Series II	Series III
NUMBER			
	'000	'000	'000
1997	18 532.2	18 532.2	18 532.2
2001	19 361.4	19 297.1	19 271.6
2011	21 315.9	21 017.3	20 806.0
2021	23 078.9	22 519.0	22 089.4
2031	24 559.9	23 720.3	23 033.0
2041	25 612.6	24 475.5	23 448.1
2051	26 383.8	24 944.7	23 530.4
AVERAGE ANNUAL GROWTH RATE			
	%	%	%
1997-2001	1.1	1	1
2001-2011	1	0.9	0.8
2011-2021	0.8	0.7	0.6
2021-2031	0.6	0.5	0.4
2031-2041	0.4	0.3	0.2
2041-2051	0.3	0.2	0

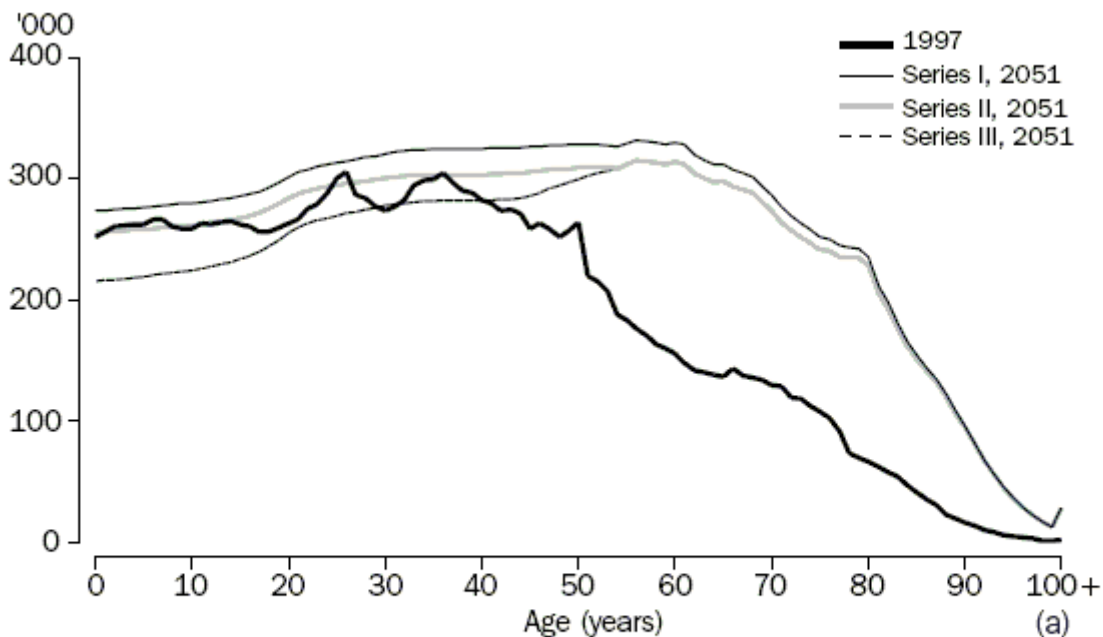
### PROJECTED POPULATION, Series II - Australia



## POPULATION AGEING

The projections show that the ageing of the population, which is already evident, is set to continue. This is the inevitable result of fertility remaining at low levels over a long period while mortality rates decline. As Australia's population growth slows, the population ages progressively, with the 1997 median age of 34.3 years increasing to between 40.1 and 41.1 years in 2021 and between 43.7 and 46.2 years in 2051.

### AGE STRUCTURE - Australia



(a) The 100 years age group includes all ages 100 years and over and therefore is not strictly comparable with single year ages in the rest of the graph.

The population aged 65 years and over rises rapidly throughout the projection period both in terms of numbers and as a proportion of the total population. This age group rises from 2.2 million in 1997 to about 4.0 million in 2021 and between 6.0 million and 6.3 million in 2051. As a proportion of the population, this represents increases from 12% in 1997 to about 18% in 2021 and between 24% and 26% in 2051.

The ageing of the population is also influenced by the declining proportion of the population in the age range 0-14 years, thereby gradually raising the median age. The population aged 0-14 years in 1997 was 3.9 million and is projected to be between 3.5 million and 4.0 million in 2021 and between 3.3 million and 4.2 million in 2051.

The projections also show substantial increases in the number of people aged 85 years or more, rising from 216,000 in 1997 to around 440,000 in 2021, and reaching between 1.1 and 1.2 million in 2051. People aged 85 years and over as a proportion of the population is projected to rise from 1.2% in 1997 to between 4.4% and 4.8% in 2051.

The age structure of the population aged 15-64 years is projected to change considerably by the end of the projection period, with the greatest growth occurring in the population aged 45-64 years. This age group rises from 4.0 million in 1997 to between 6.1 million and 6.5 million in 2051.

International comparison United Nations' projections show that ageing trends similar to Australia's are projected for many countries throughout the world. Japan, Greece, New Zealand and Canada, like Australia, are projected to roughly double the proportion of their populations aged 65 years and over by the year 2050. Over the same period, China, Hong Kong, Indonesia, Malaysia and Papua New Guinea are projected to triple the proportion of their populations in this age group. This means that by 2050 many countries, including Australia, are projected to have over 20% of their population aged 65 years or more, with Greece, Hong Kong, Italy and Japan having over 30% of their population in this age group.

## DECLINING PROPORTION OF YOUNG PEOPLE

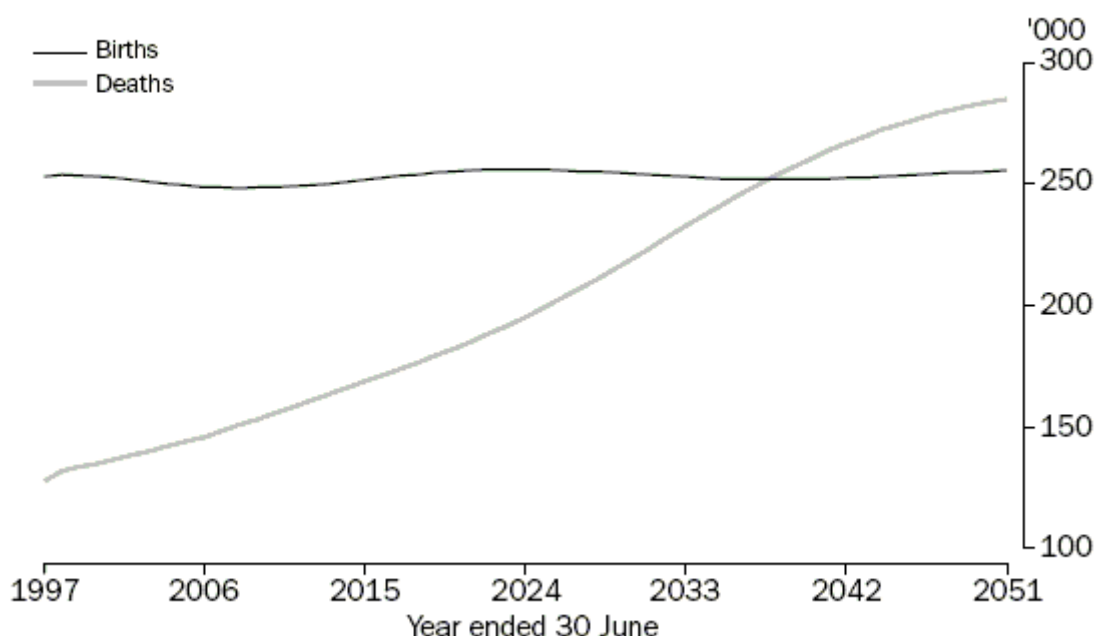
Changes in the number of persons aged 5-14 years, which closely aligns to the compulsory ages for schooling, will impact upon the provision of primary and secondary education. In 1997, this age group represented 14% of the population (2.6 million). By 2051, this is projected to drop to between 10% and 11% of the population (between 2.2 million and 2.8 million).

The number of persons aged 15-24 years, who are the main participants in post-compulsory education, and who will enter the workforce for the first time after completing this phase of their education, is projected to drop from 14% of the population in 1997 (2.7 million) to around 11% in 2051 (between 2.5 million and 3.0 million).

## PROJECTED BIRTHS AND DEATHS

In 1996-97, there were 253,400 births and 127,600 deaths, resulting in a natural increase of the population of 125,800 persons. While the number of deaths is projected to more than double over the projection period, due to the ageing of the population, the number of births is projected to increase by less than 9% and may even decline (Series III) by 15% by 2051. Regardless of which combination of assumptions is chosen, the natural increase of the population declines quite rapidly, with the number of deaths exceeding the number of births between 2032 and 2041.

### PROJECTED BIRTHS AND DEATHS, Series II - Australia



Under Series II, the projected number of births rises to 255,800 in 2051 after dipping slightly in the initial years. Deaths, on the other hand more than doubles, increasing by 124% to 285,200 in 2051. This results in a decline in natural increase from 122,400 in 1998 to -29,400 in 2051, an unprecedented low level.

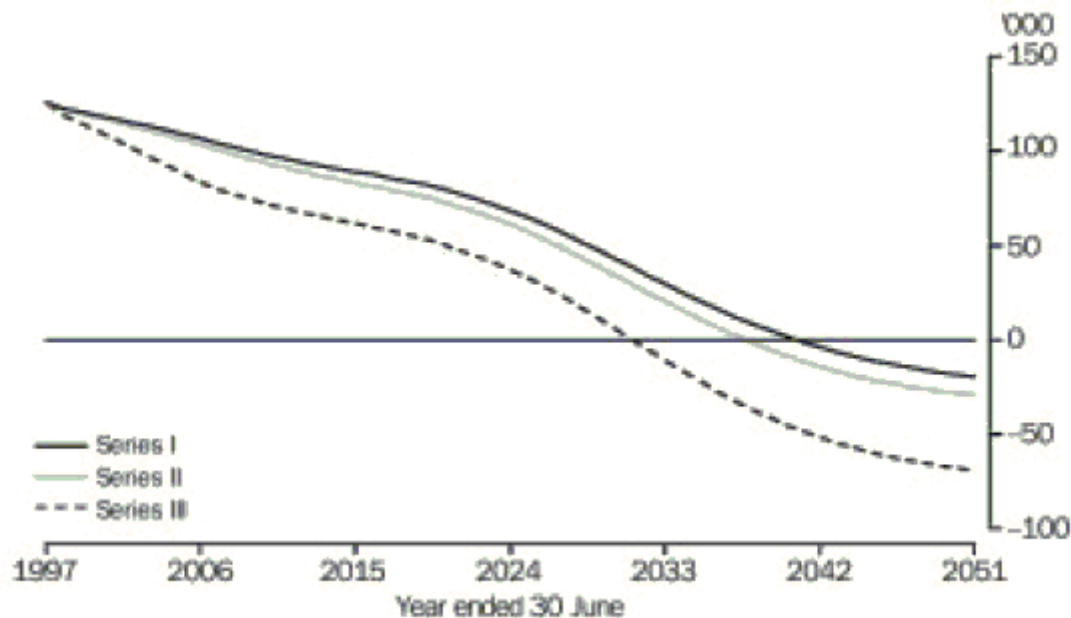
Under Series I, births rise to 264,200 in 2021 and 273,300 in 2051. Natural increase is higher than the other series, but still declining, reaching -19,500 by 2051.



Under Series III, births fall to 233,000 in 2021 and 215,500 in 2051. As with the other Series, the number of deaths increases steadily throughout the projection period, rising to 284,800 in 2051. This again results in negative natural increase, reaching -69,300 by 2051.

If high fertility levels are assumed and there are no net gains from overseas migration, the natural increase of the population would also fall, with the number of deaths exceeding the number of births from 2030 onwards.

### PROJECTED NATURAL INCREASE - Australia



## FURTHER INFORMATION

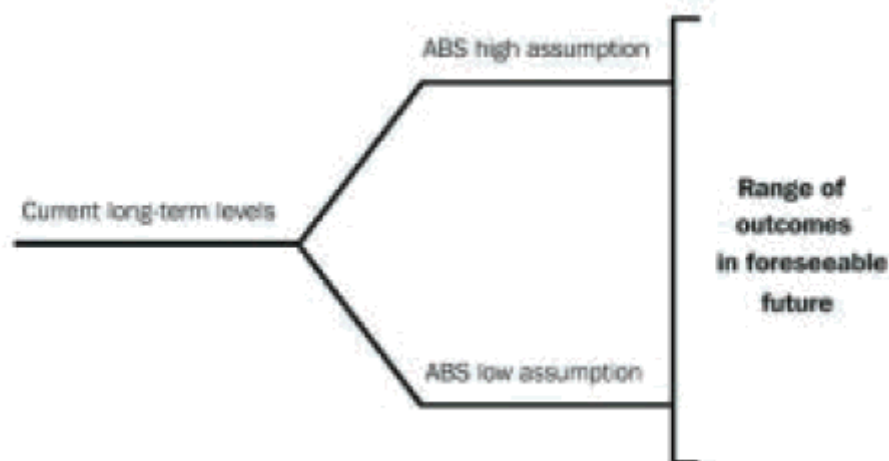
For further information about ABS population projections contact the Director of Demography.

### Appendix 1: Assumptions

The following is a summary of the assumptions used for each component of population growth to compile the projection series for 1997-2051. The base population used for the projections is the latest published estimate of 18.5 million as at 30 June 1997.

## PRINCIPLES OF ASSUMPTIONS

The future is characterised by uncertainty, which is why the Australian Bureau of Statistics produces a range of assumptions for fertility, overseas migration and internal migration. These assumptions are not intended to show the full range of possible futures, but rather illustrate some possible futures within that range.



## SUMMARY OF ASSUMPTIONS

**Fertility 1** The total fertility rate falls to 1.75 births per woman by 2005-06, and then remains constant (high assumption).

**Fertility 2** The total fertility rate declines to 1.6 births per woman in 2005-06, and then remains constant (low assumption).

**Mortality** 1994-96 mortality rates decline to the year 2005-06 according to short-term rates of decline and then long-term rates of decline to 2050-51. By 2051, life expectancy of males will be 82.0 years and of females 86.1 years.

**Overseas migration 1** Annual net overseas migration gain of 90,000 from 1998-99 (high assumption).

**Overseas migration 2** Annual net overseas migration gain of 70,000 from 1998-99 (low assumption).

**Overseas migration 3** Zero net migration gain throughout the projection period to enable an assessment of the effect of overseas migration on population growth and distribution.

**Internal migration 1** 'Large' net gains and losses for States and Territories.

**Internal migration 2** 'Medium' net gains and losses for States and Territories.

**Internal migration 3** 'Small' net gains and losses for States and Territories.

## SERIES

These assumptions can be grouped together in 18 different ways. The uncertainty inherent in the future, and even the subjective nature of assessing current trends, means that using a range of possible outcomes rather than a single projection series gives a better impression of Australia's direction.

Summary information for all 18 possible combinations and detailed information for three series (I, II, III) are available in chapter 4 of Population Projections

1997 to 2051.

## PROJECTIONS SERIES, Assumptions Used (a) - Australia

	Internal migration (High)	Internal migration (Medium)	Internal migration (Low)
	FERTILITY 1 (High)		
Overseas migration 1 (High)	A	B	C(I)
Overseas migration 2 (Low)	D	E(II)	F
Overseas migration 3 (Zero)	G	H	I
	FERTILITY 2 (Low)		
Overseas migration 1 (High)	J	K	L
Overseas migration 2 (Low)	M(III)	N	O
Overseas migration 3 (Zero)	P	Q	R

(a) The mortality assumption remains constant throughout all projections series.

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